

**Notice of Allowability**

Application No.

10/077,371

Examiner

Belix M. Ortiz

Applicant(s)

SAWDON ET AL.

Art Unit

2164

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12/30/2005.
2. ☒ The allowed claim(s) is/are 1-30.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 3/16/2006.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
**CHARLES HONES**  
**SUPERVISORY PATENT EXAMINER**

**DETAILED ACTION**

**EXAMINER'S AMENDMENT**

1. The following is an Examiner's statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose, make obvious, or otherwise suggest the structure of the applicant's prediction program, prediction apparatus, and prediction method together with the other limitations of the independent claims.

The dependent claims being further limiting and definite are also allowable. Any comments considered necessary by applicant must be submitted no later than the payment of the Issue Fee and, to avoid processing delays, should preferably accompany the Issue Fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Authorization for this examiner's amendment was given in an interview with Jeffrey N. Giunta on March 16, 2006.

**AMENDMENT TO THE CLAIMS:**

Claims 22, 25 and 28 have been amended. Claims 1-30 remain pending in the application.

**WHAT IS CLAIMED IS:**

22. (Previously Presented) A computer readable medium including computer instructions for retrieving snapshot data, the computer instructions comprising instructions for:

accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one inode comprising at least one ditto address, wherein the at least one ditto address refers to a data block that has a disk address in an inode associated with one of a more recent snapshot and a source file system;

determining if a data block to be modified is referenced by a ditto address in an inode of the specified file system snapshot;

copying, in response to determining the data block to be modified is referenced by a ditto address in an inode of the specified file system snapshot, the data block to be modified into the specified snapshot;

copying the data block to be modified into a next oldest file system snapshot; and  
modifying the data block copied into the specified snapshot; and  
wherein the medium comprises at least one of:

non-volatile storage, volatile storage, and removable storage.

25. (Currently Amended) A system for updating a file system snapshot, comprising:  
a first file system snapshot in a plurality of file system snapshots, wherein the first file system snapshot includes data contents;

data contents of the first file system snapshot, wherein the data contents comprises at least one of an empty inode and an inode comprising at least one ditto address,

wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot, and a source file system, and

wherein a ditto address refers to a data block that has a disk address in an inode associated with one of the more recent snapshot, and a source file system;  
and

~~means for writing the data contents to a next oldest file system snapshot.~~

a file system that modifies a target data block in the first file system snapshot, the target data block having an empty inode or an inode comprising at least one ditto address, by copying data in a data block indicated by the disk address into target data block of the first system snapshot and into a next oldest file system snapshot; and modifying, after the copying, the target data block.

28. (Currently Amended) A system for retrieving snapshot data, comprising:
- a shadow inode in a first snapshot dataset corresponding to a source file, the shadow inode comprising at least one of an empty inode and an inode comprising at least one implied reference,
  - wherein an empty inode indicates that a metadata corresponding to the empty inode is contained in one of a more recent snapshot, and a source file system, and
  - wherein an implied reference refers to a data block that has a disk address in an inode associated with one of the more recent snapshot, and a source file system; and
  - a next most recent snapshot dataset, and
  - a file system that modifies metadata of the shadow inode that comprises an empty inode by copying the metadata corresponding to the inode to be modified into the shadow inode, writes the metadata into the next oldest file system snapshot, and modifies the metadata copied into the shadow inode.

### ***Reasons for Allowance***

1. Claims 1-30 are allowed.
2. The following is a statement of reasons for the indication of allowable subject matter: the prior arts of records, neither anticipates nor renders obvious the following limitations as claimed:

As to claims 1, 9, and 17, the prior art of records fail to anticipate or suggest a method, a system, and computer readable medium for updating modifying a file system snapshot comprising:

accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one empty inode, wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot and a source file system;

determining if an inode to be modified in the specified snapshot is an empty inode;

copying, in response to determining the inode to be modified is an empty inode, metadata corresponding to the inode to be modified into the inode to be modified;

writing the metadata into a next oldest file system snapshot; and

modifying the metadata copied into the inode to be modified, together with the other limitations of the independent claims.

As to claims 6, 14, and 22, the prior art of records fail to anticipate or suggest a method, a system, and computer readable medium for modifying snapshot data comprising:

accessing a specified file system snapshot in a plurality of file system snapshots, wherein the specified file system snapshot comprises at least one inode comprising at least one ditto address, wherein the at least one ditto address refers to a data block that has a disk address in an inode associated with one of a more recent snapshot and a source file system;

determining if a data block to be modified is referenced by a ditto address in an inode of the specified file system snapshot;

copying, in response to determining the data block to be modified is referenced by a ditto address in an inode of the specked file system snapshot, the data block to be modified into the specified snapshot;

copying the data block to be modified into a next oldest file system snapshot;

modifying the data block copied into the specified snapshot; and

wherein the medium comprises at least one of:

non-volatile storage, volatile storage, and removable storage, together with the other limitations of the independent claims.

As to claim 25, the prior art of records fail to anticipate or suggest a system for updating a file system snapshot, comprising:

a first file system snapshot in a plurality of file system snapshots, wherein the first file system snapshot includes data contents;

data contents of the first file system snapshot, wherein the data contents comprises at least one of an empty inode and are inode comprising at least one ditto address,

wherein an empty inode indicates that metadata corresponding to the empty inode is contained in one of a more recent snapshot, and a source file system, and

wherein a ditto address refers to a data block that has a disk address in an inode associated with once of the more recent snapshot, and a source file system; and

a file system that modifies a target data block in the first file system snapshot, the target data block having an empty inode or an inode comprising at least one ditto address, by copying data in a data block indicated by the disk address into target data block of the

first system snapshot and into a next oldest file system snapshot; and modifying, after the copying, the target data block, together with the other limitations of the independent claims.

As to claim 28, the prior art of records fail to anticipate or suggest a system for retrieving snapshot data, comprising:

- a shadow inode in a first snapshot dataset corresponding to a source file, the shadow inode comprising at least one of an empty inode and an inode comprising at least one implied reference,

- wherein an empty inode indicates that a metadata corresponding to the empty inode is contained in one of a more recent snapshot, and a source file system, and

- wherein an implied reference refers to a data block that has a disk address in an inode associated with one of the more recent snapshot, and a source file system;

- a next most recent snapshot dataset, and

- a file system that modifies metadata of the shadow inode that comprises an empty inode by copying the metadata corresponding to the inode to be modified into the shadow inode, writes the metadata into the next oldest file system snapshot; and modifies the metadata copied into the shadow inode, together with the other limitations of the independent claims.


*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Belix M. Ortiz whose telephone number is 571-272-4081. The examiner can normally be reached on Monday-Friday 9am-5pm. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

bmo

March 16, 2006.

  
**CHARLES RONES**  
**SUPERVISORY PATENT EXAMINER**